OV7251 VGA product brief

Low Power and Compact CameraChip™ Sensor with Industry's Smallest Global Shutter Pixel

available in a lead-free package

The OV7251 is a small form factor, low power CameraChip™ sensor that uses a global shutter to reduce or eliminate unwanted image artifacts, which occur with traditional rolling shutter image sensors as a result of motion during image capture. The sensor's global shutter and excellent low-light sensitivity allow it to be used for any application that has a need for gesture detection, head and eye tracking, and depth and motion detection.

The OV7251's compact form factor makes it a highly attractive camera solution for space-constrained applications such as head-mounted displays, smartphones, tablets, notebooks and Ultrabooks. Likewise, the sensor's low-power consumption makes it an ideal dedicated gesture sensor for similar application areas.

Leveraging the industry's smallest global shutter pixel, the black and white OV7251 is capable of capturing VGA (640x480) resolution video at 120 frames per second (fps), QVGA (320x240) at 180 fps with binning, and QQVGA (160x120) at 360 fps with binning and skipping. The OV7251's high frame rates make it an ideal solution for low-latency machine vision applications.

The 1/7.5-inch OV7251 features multiple low-power modes, including light sensing mode and ultra-low power standby mode. In light sensing mode, the OV7251 behaves like an Ambient Light Sensor (ALS), which wakes the sensor up from "sleep mode" only when a change in light has been detected. Similarly, in ultra-low power mode, the sensor can reduce the resolution and frame rates to further reduce power consumption.

Find out more at www.ovt.com.

Applications

- Computer Vision
- 3D Systems
- Gesture Recognition
- Feature Tracking

OV7251

Product Features

- improved shutter efficiency for machine vision applications
- integral 850 nm bandpass filter
- 3 µm x 3 µm pixel with OmniPixel®3-GS technology
- automatic black level calibration (ABLC)
- programmable controls for:
  - frame rate
  - mirror and flip
  - cropping
  - windowing
- support output formats: 8/10-bit RAW
- support for image sizes:
  - 640 x 480
  - 320 x 240
  - 160 x 120

- fast mode switching
- supports horizontal and vertical 2:1 and 4:1 monochrome subsampling
- supports 2x2 monochrome binning
- one-lane MIPI serial output interface
- one-lane LVDS serial output interface
- embedded 256 bits of one-time programmable (OTP) memory for part identification
- two on-chip phase lock loops (PLLs)
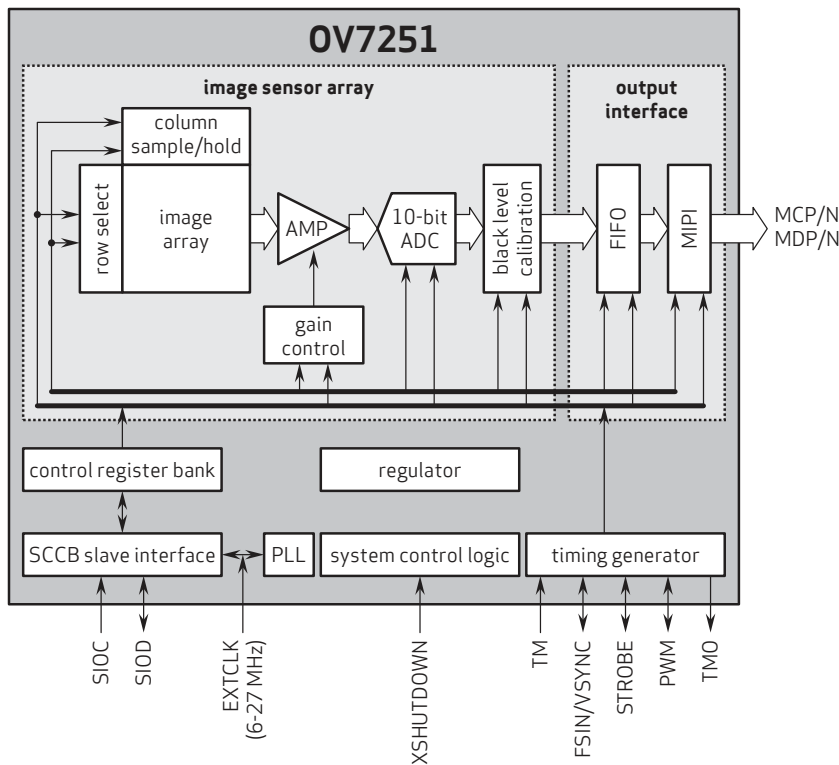- built-in 1.5V regulator for core
- PWM
- built-in strobe control
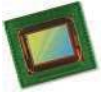
Ordering Information

- **OV07251-A35A-1G** (b&w, lead-free, 35-pin CSP)
- **OV07251-G04A-1G** (b&w, reconstructed wafer with good die)
- **OV07251-A35A-1J** (b&w, lead-free, 35-pin CSP, black mask)
- **OV07251-A35A-2B** (b&w, improved PLS, lead-free, 35-pin CSP)
- **OV07251-G04A-2B** (b&w, improved PLS, reconstructed wafer with good die)

Technical Specifications

- **active array size:** 640 x 480
- **maximum image transfer rate:**
  - **640 x 480:** 120 fps
- **power supply:**
  - **analog:** 2.8V (nominal)
  - **core:** 1.5V (optional)
  - **I/O:** 1.8V (nominal)
- **power requirements:**
  - **active:** 119 mW @ 120 fps, VGA output
  - **standby:** 15 µA for AVDD, 40 µA for DOVDD without input clock, 700 µA for DOVDD with input clock
  - **XSHUTDOWN:** 5 µA for AVDD, 5 µA for DOVDD
- **output formats:** 10-bit B&W RAW

- **temperature range:**
  - **operating:** -30°C to +70°C junction temperature
  - **stable image:** 0°C to +50°C junction temperature
- **output interface:** 1-lane MIPI/LVDS serial output
- **lens size:** 1/7.5"
- **lens chief ray angle:** 29° non-linear
- **scan mode:** progressive
- **pixel size:** 3 µm x 3 µm
- **image area:** 1968 µm x 1488 µm

Functional Block Diagram

Version 1.9, October 2020